PUBLIC HANDOUTS

ROUTE 13 CORRIDOR CULTURAL RESOURCES PLANNING

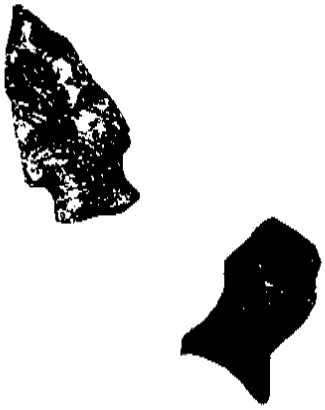
Cultural Resource Planning

Archaeology from 900 Kilometers up in the Sky

Federal Highway Administration's 1984 Biennial Award

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
P.O. BOX 778
DOVER, DELAWARE 19903

PROPOSED ROUTE 13 RELIEF CORRIDOR
CULTURAL RESOURCES PLANNING

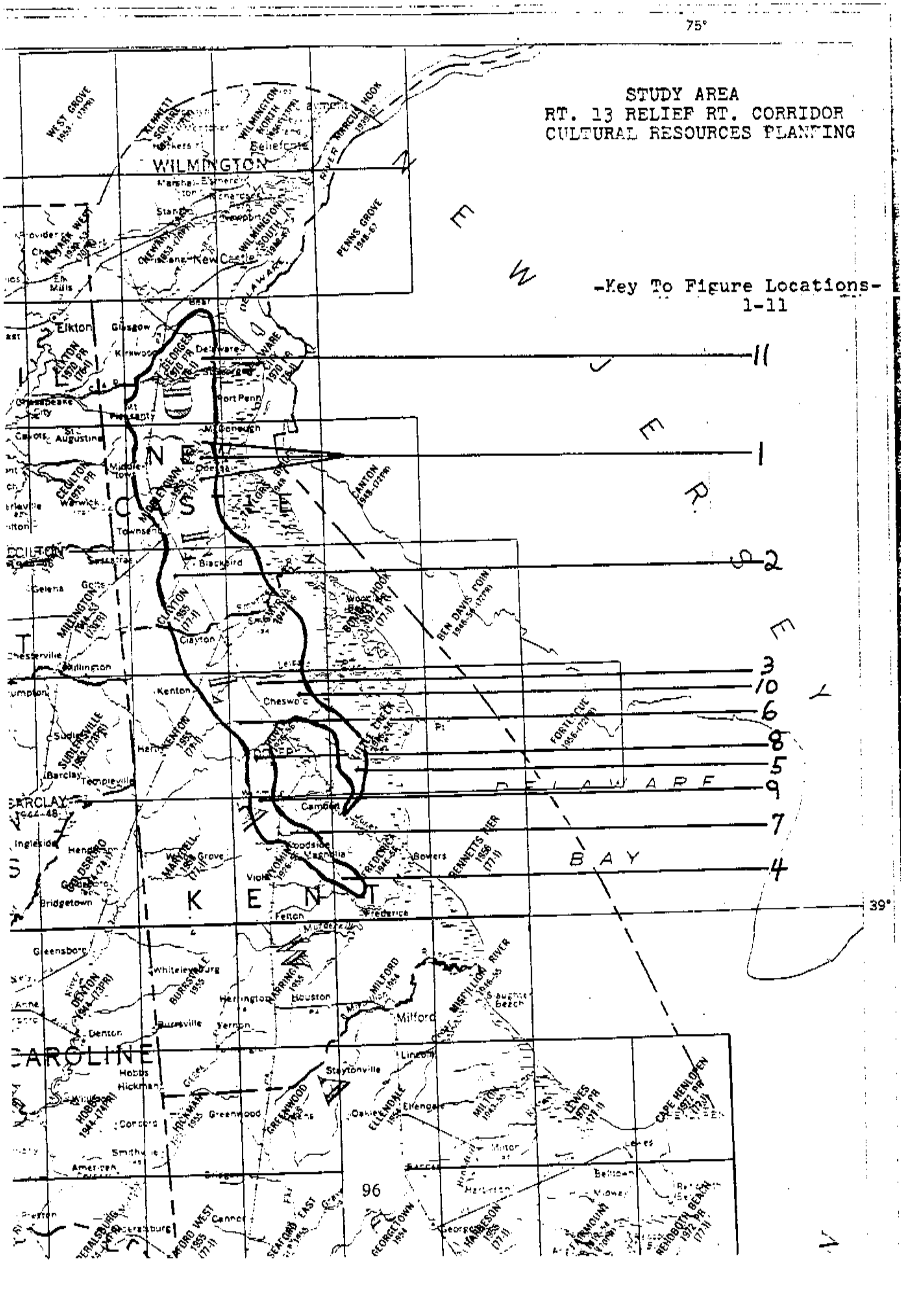


A historic and prehistoric cultural resource planning survey is being conducted by the Delaware Department of Transportation, Division of Highways, and the Federal Highway Administration in conjunction with the University of Delaware, Center for Archaeological Research. The planning is necessitated by the proposed U.S. Route 13 corridor in New Castle and Kent Counties.

The Route 13 corridor study area (approximately 40 miles N-S by 8 miles E-W) traverses some of the oldest and most important prehistoric and historic settlement areas in the State of Delaware. The earliest known prehistoric peoples lived during the **Paleo-Indian Period,** from about 12,000 B.C. - 6500 B.C. This period overlapped and immediately followed the last great glaciation of North America. These peoples probably lived a nomadic existence, collecting wild vegetal foods and hunting now extinct large game animals such as bison, mastadons, sloths, etc. The project area contains no known sites from this period, but they have been found nearby and may be located during the survey.

The **Archaic Period** (6500 B.C. - 3000 B.C.) saw the establishment of oak and hemlock forests over the landscape, with the peoples adapting to present day plant and animal forms. The adaptation was one of a more generalized hunting and gathering pattern in which plant food resources would have played an increasingly important role. The settlement pattern consisted of large base camps and outlying hunting sites, reflective of a social organization characterized by the seasonal waxing and waning of band groups. Archaic Period sites in the project area include the Indian Mound site (7NC-E-2) in northern New Castle County and (7K-A-10), a procurement site near Smyrna.

Delaware Department of Transportation


STUDY AREA
RT. 13 RELIEF RT. CORRIDOR
CULTURAL RESOURCES PLANNING
-Key To Figure Locations-
1-11
11
1
2
3
10
6
8
5
9
7
4
75°
39°
WILMINGTON
NEW JERSEY
DELAWARE
BAY
KENT
CAROLINE
Elkton
Glasgow
Kirkwood
Delaware City
Port Penn
Odessa
Middletown
Townsend
Blackbird
Clayton
Smyrna
Leipsic
Kenton
Cheswold
Dover
Camden
Woodside
Magnolia
Frederica
Felton
Bowers
Harrington
Houston
Milford
Lincoln
Greenwood
Ellendale
Milton
Lewes
Denton
Greensboro
Bridgetown
Hobbs
Hickman
Millington
Sudlersville
Templeville
Chesapeake City
St. Augustine
Warwick
Galena
Ingleside
Henderson
Whiteleysburg
Burrsville
Concord
Vernon
Staytonville
Milford
Cannon
Preston
Federalsburg

The **Woodland I Period** (3000 B.C. - A.D. 1000) saw a flourishing of tool types and a large increase in the number of known sites within the project area. In addition, large sedentary base camps were established, such as the Robbins Farm, Barker's Landing, and Coverdale sites in southern Kent County, and the Hell Island site near Odessa. The intensive harvesting of wild plant foods that may have approached the efficiency of agriculture, and the introduction of broadbladed, knife-like chipped stone tools were important developments during this period. Also seen was the addition of stone, and later ceramic, containers, which allowed for the efficient cooking and storing of foods. Major trade networks are evident from the presence of exotic raw materials utilized for the manufacture of utilitarian and ceremonial objects.

The **Woodland II Period** (A.D. 1000 -A.D. 1650) contains many similar resource procurement methods and the large base camp settlement system of the Woodland I Period. However, there was an increasing reliance on plant foods and coastal resources, such as shellfish. Social organization changes were evidenced by a collapse of the trade and exchange networks and the end of elaborate cemeteries. An important site from this period is the Hughes-Willis site near Little Creek, a macro-band, summer-fall nut processing camp.

The **Contact Period** (A.D. 1650 - A.D. 1750) is that period when European settlers entered the area and first made contact with the native peoples. These sites are characterized by a mixing of Indian and European lifeways and artifacts and have much to tell about the acculturation process experienced by the Indians. Unfortunately, no documented Contact Period sites have ever been found in Delaware, although they have been found in Pennsylvania and other surrounding states.

The **Historic Period**, although only about 350 years in length, is equally as complex. The first permanent settlement in Delaware was the Dutch settlement of Zwaanendael, established as a whaling colony near present-day Lewes in 1629. However, relatively little settlement took place in the project area for the remainder of the seventeenth century. The land was sparsely settled, with scattered subsistence farms and logging, milling, and fur trading operations along the principal water courses, which were the major transportation routes.

The Delmarva Peninsula has long been primarily an agricultural region and its historic development is closely tied to farming practices. When William Penn assumed proprietary rights over the "three colonies on the Delaware" in 1682, settlement was strongly encouraged through the granting of land patents. Most prime agricultural land along the principal transportation routes (navigable streams and a few early cart roads) were occupied by the middle ofthe 18th century. Also at this time, many marshes, particularly along Drawyer's Creek, Appoquinimink Creek, and the Leipsic River within the project area, were drained to provide more farmland.

Most early farm production was of a "subsistence" nature, where products were grown and consumed at the same location. However, toward the end of the 18th century, wheat and timber came to be grown as "cash" crops.

The first three-quarters of the 19th century saw tremendous expansion and development on the Delmarva Peninsula. The increasing demand of large, domestic markets for the agricultural products of the hinterland and the establishment of reliable transportation facilities, including the construction of turnpikes, cartroads, canal and railroad lines, spurred the development and productivity of the "spine" of the Peninsula. The pattern of dispersed farmsteads continued, but extensive local road systems connected farmsteads to transport facilities and towns. Wheat and peaches were the market-oriented crops and many of the wealthy peach growers mansions still stand in the project area, particularly around Middletown, Odessa, and Townsend.

The late 19th century was characterized by a solidification of previous land use patterns, with small but steady growth in the agrarian towns accompanied by the introduction of light manufacturing, such as tanneries and carriage makers. Also notable within the project area was the growth of numerous black communities. Major technological developments, including advances in agricultural machinery, home construction techniques, and the introduction of gas, electricity, central heat, and indoor plumbing, profoundly affected the lifeways of the time.

The 20th century has seen the shift away from wheat and peaches to the production of soybeans and feed corn to support the lower Delmarva chicken industry. The small farming communities lost their economic importance as storage and redistribution facilities, busineses, and service providers became concentrated in the major population centers outside the project area. New homes were constructed in once predominantly rural areas and new commercial-industrial-service employers supplied jobs to the growing non-agricultural suburban populations.

The systematic survey of the study area is designed to gather information on patterns of prehistoric and historic occupation. The study area encompasses diverse environmental zones and should yield significant new data on a variety of past Delaware lifeways through time as well as refining the concepts of prehistoric and historic cultural development outlined above.

If you request any further information or particulars concerning this cultural resource project, please contact Kevin Cunningham, DelDOT Archeologist at 736-3243 or Jay Custer, Assistant Professor of Anthropology, University of Delaware at 451-2821.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
P.O. BOX 778
DOVER, DELAWARE 19903

OFFICE OF THE DIRECTOR

TELEPHONE: 302-736-3243

PUBLIC INFORMATION HANDOUT

U.S. RT. 13 CORRIDOR STUDY 1984-1985

ARCHAEOLOGY FROM 900 KILOMETERS UP IN THE SKY

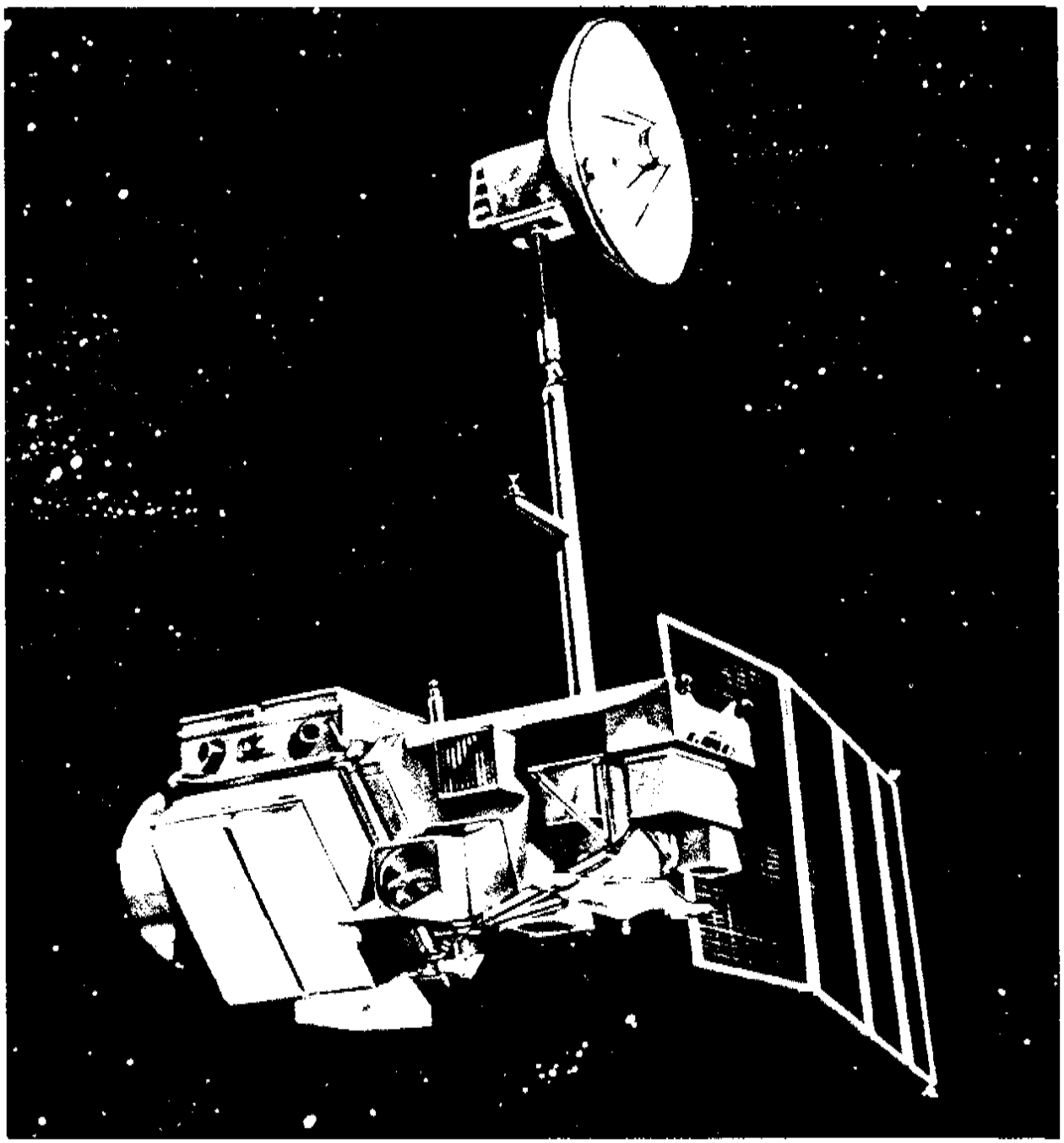
Most people associate archaeology with excavations below the earth's surface, but new research by the Delaware Department of Transportation and the University of Delaware Center for Archaeological Research has found ways to use satellites circling the earth at an altitude of more than 900 kilometers to look for prehistoric archaeological sites. Archaeologists have used aerial photographs to look for ruins, mounds, and other signs of prehistoric archaeological sites since the 1920s when Charles Lindberg photographed many Indians of the Southwestern United States. However, use of satellite imagery is a new application in archaeology.

The Delaware Department of Transportation's interest in applying satellite technology to archaeology began when it was faced with the planning and development of a large highway corridor which traversed an area known to have a high potential for prehistoric archaeological sites. In order to minimize the impact of the highway on prehistoric archaeological sites and to minimize excavation and mitigation costs, it was necessary to develop accurate predictions of archaeological sites. These predictions would then be used to guide highway design studies.

Over the past few years, the University of Delaware Center for Archaeological Research had been studying applications of LANDSAT satellite data to archaeological survey techniques. The LANDSAT satellite circles the earth at an altitude of 900 kilometers and records various types of energy reflected from the earth's surface. The data recorded by LANDSAT can then be used to map out various types of environments. In Delaware, LANDSAT data have been used to map out various types of marshes, woodlands, and soil types.

LANDSAT data can then be applied to archaeology by correlating the environments mapped by LANDSAT with known archaeological site locations. After patterns of association between site locations and environments mapped by LANDSAT are noted, other similar environmental zones with high potential for archaeological sites can be noted. Research at the University of Delaware Center for Archaeological Research developed the computer programs needed to analyze the LANDSAT and archaeological data and to map out areas with high probabiliites of archaeological site locations.

These techniques were then applied to the 40 mile long and 7 mile wide ROUTE 13 corridor and a series of specific high and medium probability zones were plotted on USGS 7.5' quadrangle maps. Field tests of the predictions showed a 90% accuracy rate. These maps are now being used to guide design alternatives of the highway.



U.S. Department
of Transportation

Federal Highway
Administration

1984 Biennial Awards

Excellence In Highway Design

Category VI
Historic Preservation and Cultural Enhancement
(Cultural, Historical, Natural, and Archeological Sites)

Specific Criteria:
- Preserving historical or archeological sites
- Restoration
- Enhancement efforts

Judged Superior

Delaware Department of Transportation

Following preliminary work in actual examination of land forms in the area of Route 13, LANDSAT satellite data were used effectively to predict locations of potential archeological resources.

Entry Form
1984 Biennial Awards

Tape this page or copy to back of each photograph and send to:

U.S. Department of Transportation
Federal Highway Administration Division Office
(see back of this form)

Excellence In Highway Design

Entries must be postmarked by May 31, 1984.

1. PLEASE TYPE. Describe the project in a problem-solution format or present the most significant achievement of the project. Particularly address one or more of the general criteria. (150-200 typewritten words, single spaced, clearly expressed in NONTECHNICAL language and easily understood by any lay person).

The University of Delaware Center for Archaeological Research, under contract with the Delaware Department of Transportation, Division of Highways, Location and Environmental Studies Office, developed methods for making quantified predictions of likely locations for prehistoric archaeological sites within Delaware's proposed Route 13 Relief Route Corridor. Predictions were developed by using synoptic analysis of LANDSAT satellite data. Locations known to contain archaeological sites were analyzed to see if special environmental factors (distance to surface water, interfaces of well-drained and poorly-drained soils, presence/absence of marshes etc.) could be correlated with site locations. Correlations were developed using a statistics package called logistical regression. Similar analyses were carried out for areas known not to contain archaeological sites as well. Environmental data were mapped using LANDSAT satellite data processed with an ERDAS interactive image analysis computer system. The ERDAS computer was then used to analyze areas with no archaeological survey data. Application of the logistical regression to unknown areas using the ERDAS/LANDSAT environmental data base compared the environmental settings of unsurveyed areas to those of surveyed areas and generated an estimate of the probability of finding a prehistoric site in the unsurveyed area based on the similarity of the environments to known site areas. Tests of predictions showed a 92% accuracy. Areas with high site probability values were mapped and used to delineate "sensitive" areas for assistance with highway alignment selection purposes.

2. Category Number and Title VI Historic Preservation and Cultural Enhancement

3. Number of Photographs in This Entry Three
(2 or 3 glossy photographs, unmounted, 11 x 14-inches, color, in duplicate)

Photo #1 I.D. No. DE 1 Photo #2 I.D. No. DE 2 Photo #3 I.D. No. DE 3

4. Name of Person Submitting This Entry and Knowledgeable Regarding Questions Concerning Entry
Kevin W. Cunningham, DelDOT Archaeologist

Address Department of Transportation, Division of Highways, P.O. Box 778
Dover, Delaware Zip 19903 Tel. No. 302-736-3243 (Area Code)

5. Name of Organization to Receive Award Delaware Department of Transportation, Division of Highways

Address P.O. Box 778 Dover, Delaware
Zip 19903 Tel. No. 302-736-4642 (Area Code)

Name of Senior Representative to Notify Joseph T. Wutka, Jr., Location & Environmental Engineer

Address Delaware Department of Transportation, Division of Highways, P. O. Box 778
Dover, Delaware Zip 19903 Tel. No. 302-736-4642 (Area Code)

6. Project Owner Delaware Department of Transportation, Division of Highways

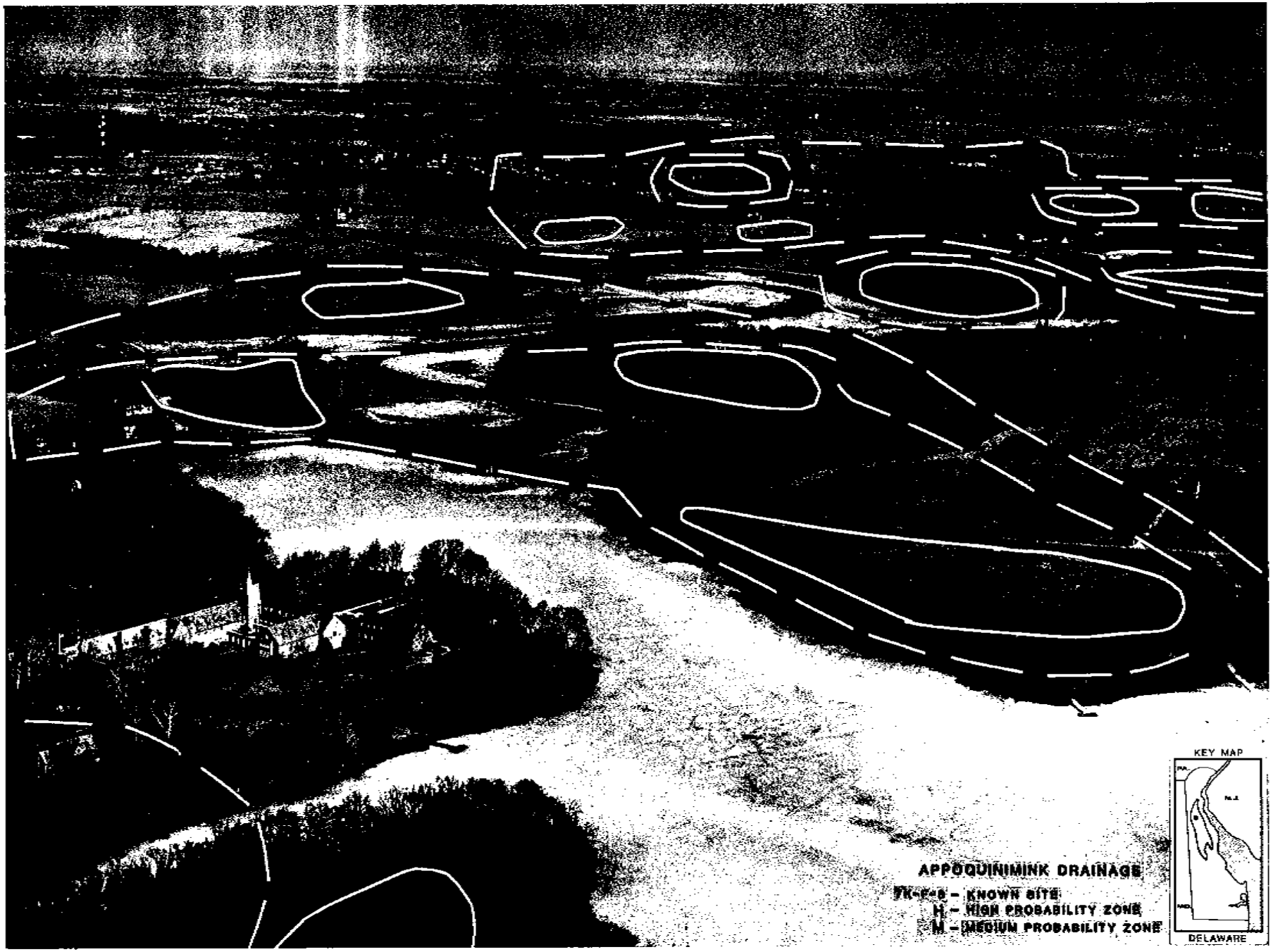
Address P.O. Box 778, Dover, Delaware
Zip 19903 Tel. No. 302-736-4642 (Area Code)

7. Agencies or Firms Responsible for Design, if Other Than Owner

Name Jay F. Custer, Director Center for Archaeological Research, University of Delaware

Address Orchard Street, Newark, Delaware
Zip 19716 Tel. No. 302-451-2821 (Area Code)

8. Project Location Information Route No. U.S. Rt. 13 Date Project Completed January 1984


APPOQUINIMINK DRAINAGE
K-F-8 - KNOWN SITE
H - HIGH PROBABILITY ZONE
M - MEDIUM PROBABILITY ZONE
KEY MAP
PA.
N.J.
MD.
DELAWARE